INSECTS OF MICRONESIA

Acarina: Mesostigmata Dermanyssidae, Laelapidae, Spinturnicidae Parasitic on Vertebrates

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INTRODUCTION

This paper includes mites in the families Dermanyssidae, Laelapidae, and Spinturnicidae which are parasitic on vertebrates in Micronesia. Six species are involved, two new to Micronesia and two new to island groups within Micronesia. The male of one species is described for the first time, and four new synonyms are designated. Specimens were collected by J. F. G. Clarke, C. K. Dorsey, H. S. Dybas, R. J. Goss, E. Hagen, J. L. Gressitt, I. La Rivers, ——— Lewellen, J. T. Marshall, Jr., R. L. Usinger, and Major Weiss. Measurements are the mean of five specimens from Micronesia when they were available. In a few cases, they were taken from specimens from Hawaii or from literature. Dr. D. H. Johnson identified most of the rodents.

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ZOOGEOGRAPHY

Five of the six species of parasitic Mesostigmata recorded from Micronesia have cosmopolitan distributions. Four of these have rodents of the genus *Rattus* as their principal hosts, and their occurrence in Micronesia probably is the result of the introduction of *R. norvegicus* and *R. rattus* to the various islands. The other species is found as frequently on birds as on mammals and also frequently in detritus. It has been reported from rats on several occasions and could have been introduced by them, by birds, or in plant materials, produce, etc. The sixth species has been reported only from bats in the south and central Pacific and Indian Ocean and apparently has a

tropical Old World distribution. Its distribution is the same as that of its host genus, *Pteropus,* which occurs only in the Old World tropics.

Table 1.—Distribution of Micronesian Dermanyssidae, Laelapidae, and Spinturnicidae parasitic on Vertebrates

	Micronesian Island Groups											Other Localities
				Caroline								
	Volcano	N. Mariana	S. Mariana	Palau	Yap	Caroline Atolls	Truk	Ponape	Kusaie	Marshall	Gilbert	
Dermanyssidae												
1. Ornithonyssus bacoti	×											Cosmopolitan
Laelapidae												
2. Androlaelaps casalis								×	×			Cosmopolitan
3. A. hermaphrodita			×									Cosmopolitan
4. A. sp.	×											
5. Laelaps echidnina	×		×	×				×	×	×		Cosmopolitan
6. L. nuttalli			×	×	×			×	×	×	×	Cosmopolitan except Europe
Spinturnicidae												
7. Meristaspis calcaratus			×	×								Old World tropics

Table 2.—Host list of mesostigmatic mites parasitic on vertebrates in Micronesia

Species of Acarina	Hosts															
	Rattus exulans	R. norvegicus	R. rattus	R. r. ?flavipectus	R. r. mansorius	Rattus sp.	R. nest	rat	Pteropus mariannus mariannus	Pteropus sp.	fruit bat	Collocalia nest	Ptilinopus ponapensis hernsheimi	rotten wood	under bark	Beriese sample
Dermanyssidae																
1. Ornithonyssus bacoti		×														
Laelapidae																
2. Androlaelaps casalis												×		×		
3. A. hermaphrodita					×											
4. A. sp.		×														
5. Laelaps echidnina	×	×	×	×		×	×	×								
6. L. nuttalli	×	×	×	×	×	×		×					×		×	×
Spinturnicidae																
7. Meristaspis calcaratus									×	×	×					

SYSTEMATICS

KEY TO MICRONESIAN SPECIES OF DERMANYSSIDAE, LAELAPIDAE, AND SPINTURNICIDAE PARASITIC ON VERTEBRATES

1. Tritosternum present and well developed, with lacinae (Dermanyssidae, Laelapidae) 2
   Tritosternum absent or very rudimentary (Spinturnicidae)..**Meristaspis calcaratus**
2. Chelae strong, dentate; corniculi well defined (Laelapidae)..... 3
   Chelae weak, nearly always edentate; corniculi poorly defined (Dermanyssidae) .....**Ornithonyssus bacoti**
3. Genitoventral plate with 1 pair of setae (*Androlaelaps*)..... 4
   Genitoventral plate with 4 pairs of setae (*Laelaps*)..... 5
4. Leg II with several stout ventral setae, that on femur much larger than others .....**Androlaelaps hermaphrodita**
   Leg II with setae not stouter than equivalent setae on other legs..... .....**Androlaelaps casalis**
5. Genitoventral plate greatly enlarged posteriorly, caudal margin concave and surrounding anterior portion of anal plate.....**Laelaps echidnina**
   Genitoventral plate only slightly enlarged posteriorly and not surrounding anal plate.....**Laelaps nuttalli**

FAMILY DERMANYSSIDAE

Genus **Ornithonyssus** Sambon

Ornithonyssus Sambon, 1928, Ann. Trop. Med. Parasit. 22: 105.

Type species: *Dermanyssus sylviarum* Canestrini and Fanzago, 1877.

This genus is restricted to the New World as interpreted by Furman and Radovsky (1963),[1] except for species which have been widely dispersed by human activity. However, as pointed out by Evans and Till (1966), a comprehensive revision of the group is needed. One species has been recorded from Micronesia.

1. Ornithonyssus bacoti (Hirst) (fig. 1).

Leiognathus bacoti Hirst, 1913, Bull. Ent. Research **4**: 122.

Ornithonyssus bacoti: Pippin and Shimada, 1966, Jour. Medical Ent. 2 (4): 384.

Female. Medium to large sized depending upon degree of engorgement; dorsal shield 660 μ long, 198 μ wide, with 18 pairs of setae, dorsal integument with numerous setae; sternal shield 50 μ long, 120 μ wide, extending to posterior margin of coxae II, posterior margin concave, 2nd and 3rd pair of setae longer than 1st pair, metasternal setae free; genital shield 177 μ long, 73 μ wide, tapering, with 1 pair of setae; anal shield 129 μ long, 83 μ wide, pear-shaped, anal pore in anterior half, paranal setae posterolateral to pore, slightly longer than postanal seta; ventral integument with about 35 pairs of setae, metapodal shields small and poorly developed; peritreme extends to middle of coxa I; chaetotaxy of legs normal; chelicera slender, chelae edentate, pilus dentilis absent.

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[1] Dates in parentheses refer to Literature Cited, p. 148, or to Bibliography, vol. 2, Insects of Micronesia series.

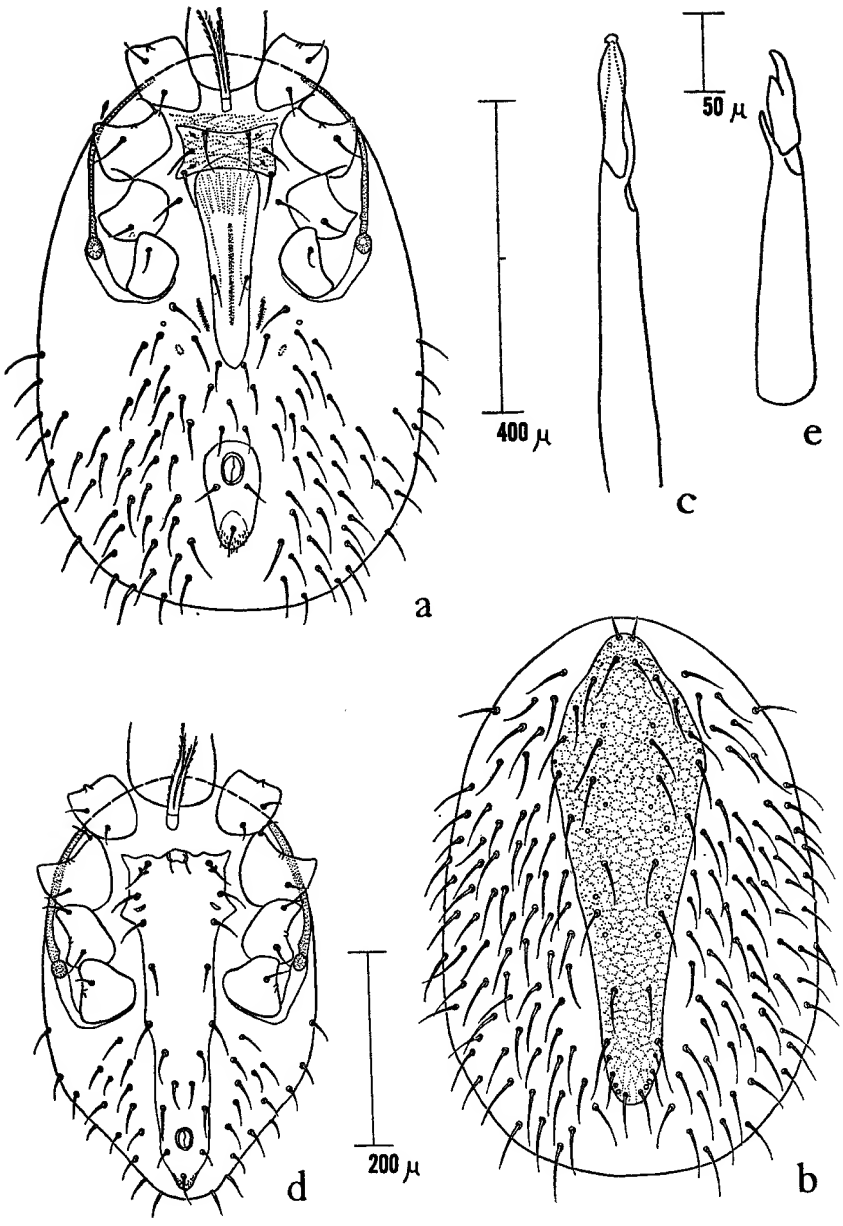

FIGURE 1.—*Ornithonyssus bacoti:* **a,** female ventral view; **b,** female dorsal view; **c,** female chelicera; **d,** male ventral view; **e,** male chelicera.

Male. Dorsal shield 528 μ long, 270 μ wide, with 21 pairs of setae; dorsal and ventral integument with considerably fewer setae than female; holoventral shield 444 μ long, 100 μ wide, narrow, with 8 pairs of setae excluding anals; chelae edentate, spermadactyl short.

DISTRIBUTION: Cosmopolitan.

VOLCANO IS. Iwo JIMA: Recorded by Pippin and Shimada (1966) from *Rattus norvegicus.*

HOSTS: Recorded from many species of rodents, especially *Rattus norvegicus* and *R. rattus.*

The Micronesian material at hand does not contain specimens of this species.

FAMILY LAELAPIDAE

Genus **Androlaelaps** Berlese

Androlaelaps Berlese, 1903, Zool. Anzieger **27**: 14.

Type species: *Laelaps (Iphis) hermaphrodita* Berlese, 1887.

Till (1963) has discussed the classification of this large group of mites and considers *Haemolaelaps* a synonym of *Androlaelaps.* Members of the genus are found throughout the temperate and tropical regions of the world. One species (*Androlaelaps pachyptilae* Zumpt and Till) has been recorded from several subantarctic islands. Two species are recorded from Micronesia, both for the first time.

2. **Androlaelaps casalis** (Berlese) (fig. 2).

Iphis casalis Berlese, 1887, Acari, Myr. Scorp. Ital. **38** (8).

Female. Medium sized; dorsal shield 506 μ long, 355 μ wide, with 39 pairs of setae plus several unpaired accessory setae, long pair of posterior setae barbed, about 9 pairs of setae on dorsal integument; sternal shield 78 μ long, 105 μ wide, extending to middle of coxae III, posterior margin concave, metasternal setae and pores free; genital shield 114 μ wide, slightly expanded and broadly rounded posteriorly; anal shield 75 μ long, 80 μ wide, flattened anteriorly, broadly rounded anterolaterally, anal pore about its length from anterior margin, paranal setae opposite middle to posterior end of pore, as long as postanal seta; ventral integument with 12 pairs of setae, metapodal shields very narrow, much longer than wide; peritreme extends to middle of coxa I; chaetotaxy of legs normal, none in form of spines, all setae in general rather fine and of moderate length; chelicera robust, chelae dentate, pilus dentilis setiform.

Male. Dorsal shield 345 μ long, 245 μ wide; holoventral shield 280 μ long, 175 μ wide, greatly expanded behind coxae IV; tip of moveable chela serrate, with long, slightly curved spermadactyl.

DISTRIBUTION: Cosmopolitan.

PONAPE. Female, Colonia, Agric. Expt. Station, ex rotten wood, Jan. 1953, Gressitt.

KUSAIE. Fifteen males, 47 females, eight nymphs, Yela Cave, ex two *Collocalia* nests in cave, April 1953, Clarke.

HOSTS: Recorded from a wide variety of birds and mammals; also found frequently in straw, detritus, and other materials.

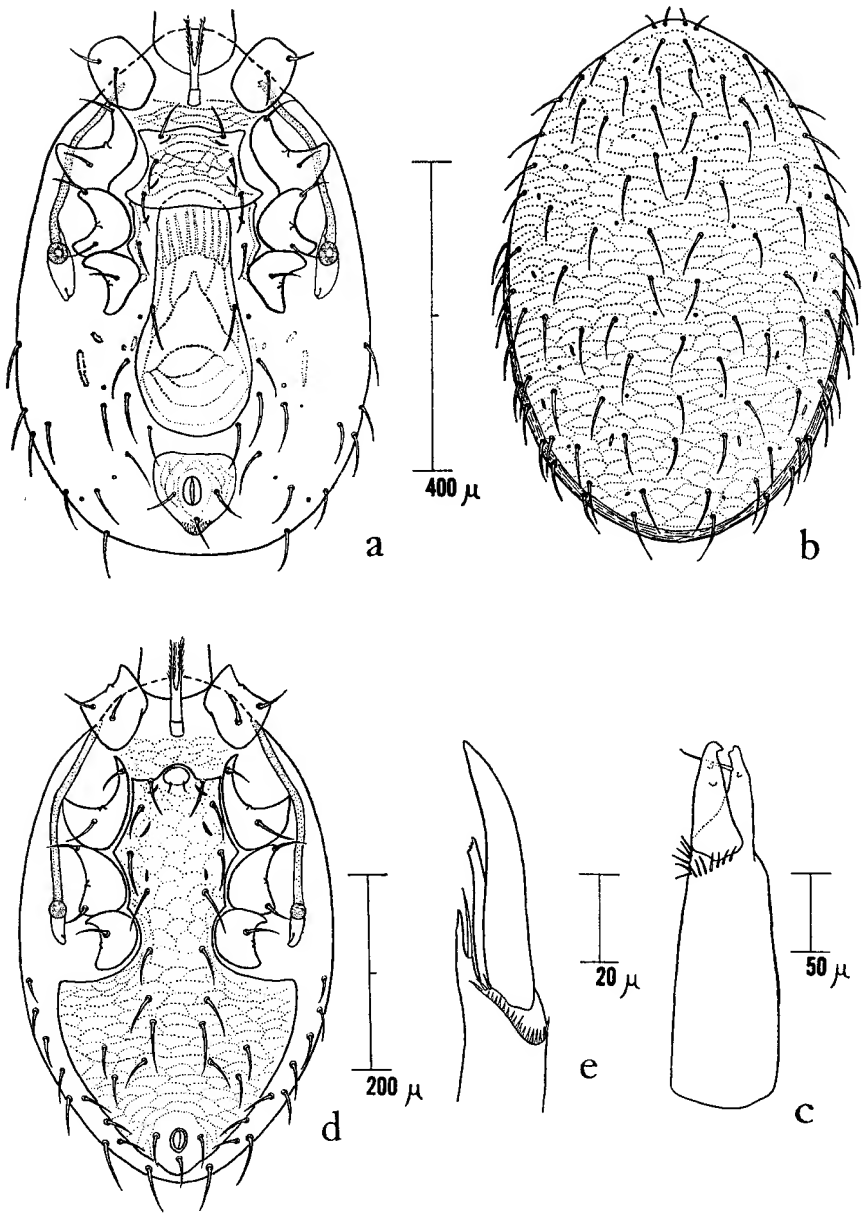

FIGURE 2.—*Androlaelaps casalis:* **a,** female ventral view; **b,** female dorsal view; **c,** female chelicera; **d,** male ventral view; **e,** male chelicera.

3. **Androlaelaps hermaphrodita** (Berlese) (fig. 3).

Laelaps (Iphis) hermaphrodita Berlese, 1887, Acari, Myr. Scorp. Ital. **40** (6).

Androlaelaps setosus Fox, 1946, Biol. Soc. Washington, Proc. **59**: 173. New synonymy.

Androlaelaps foxi Fonseca, 1959, Mem. Inst. Butantan **28**: 180. New synonymy.

Haemolaelaps vietnamensis Grokhovskaya and Nguen-Huan-Hoe, 1961, Zool. Zhur. **40** (11): 1636. New synonymy.

Haemolaelaps travisi Delfinado, 1961, Field. Zool. **44** (6): 49. New synonymy.

Female. Medium sized, dorsal shield 729 μ long, 494 μ wide, with 39 pairs of setae, about 8 pairs of setae on dorsal integument; sternal shield 112 μ long, 132 μ wide, extending to coxae III, posterior margin slightly concave, 2nd and 3rd pair of setae longer than 1st pair, metasternal setae and pores free; genital shield 157 μ wide, slightly expanded and broadly rounded posteriorly; anal shield 123 μ long, 117 μ wide, flattened anteriorly, anal pore less than its length from anterior margin, paranal setae opposite middle to posterior end of pore, slightly longer than postanal seta; ventral integument with about 17 pairs of setae, metapodal shields much longer than wide; peritreme extends to middle of coxa I; leg II stouter than others, with large coxa and stout ventral spurlike seta on femur and genu, tibia with 1 and tarsus with 2 ventral setae heavier than others but not spurlike; chelicera robust, chelae dentate, pilus dentilis setiform.

Male. Dorsal shield 570 μ long, 379 μ wide; holoventral shield 472 μ long, 268 μ wide, greatly expanded behind coxae IV; leg II as in female; chelae edentate, spermadactyl relatively straight.

DISTRIBUTION: Cosmopolitan.

S. MARIANA IS. SAIPAN: Female, ex *Rattus rattus mansorius,* May 1945, Dybas and Marshall.

HOSTS: Recorded from several species of small mammals, most of which are rodents and over half of which belong to the genus *Rattus.*

I can find no differences, which I do not consider within the acceptable range of variation, between *Androlaelaps hermaphrodita* and the four species listed as new synonyms.

4. **Androlaelaps** sp.

Haemolaelaps sp., Pippin and Shimada, 1966, Jour. Medical Ent. **2** (4): 384.

An unidentified species of *Haemolaelaps* from *Rattus norvegicus* was reported by Pippin and Shimada (1966) from Iwo Jima, Volcano Is.

Genus **Laelaps** Koch

Laelaps Koch, 1836, Deutschl. C. M. A. **4**: 19.

Type species: *Laelaps hilaris* Koch, 1836.

This large genus is found throughout the temperate and tropical regions of the world; two species are recorded from Micronesia. The most recent review is by Tipton (1960).

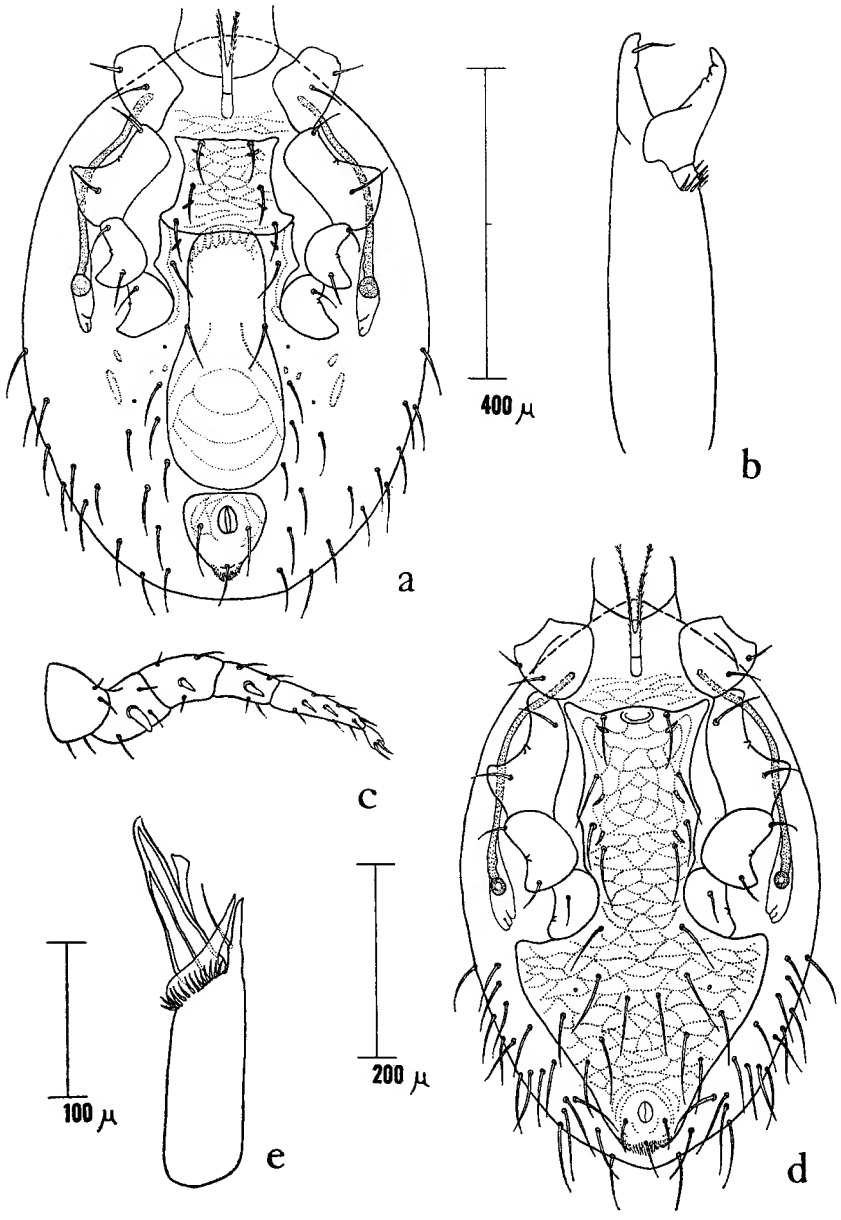

FIGURE 3.—*Androlaelaps hermaphrodita:* **a**, female ventral view; **b**, female chelicera; **c**, female leg II, ventral view; **d**, male ventral view; **e**, male chelicera.

5. **Laelaps echidnina** Berlese (fig. 4).
   Laelaps (Iphis) echidninus Berlese, 1887, Acari, Myr. Scorp. Ital. **39** (1).
   Laelaps echidninum (sic) : Alicata, 1948, Pacific Science **2** (1) : 66.
   Laelaps echidninus: Alicata, 1948, Hawaiian Ent. Soc., Proc. **13** (2) : 201. —Marshall, 1955, Jour. Mammal. **36** (2) : 261.—Jackson (in Storer), 1962, B. P. Bishop Mus., Bull. **225** : 191.
   Echinolaelaps echidninus: Hurlbut, 1949, Pacific Science **3** (3) : 278.—Pippin and Shimada, 1966, Jour. Medical Ent. **2** (4) : 384.

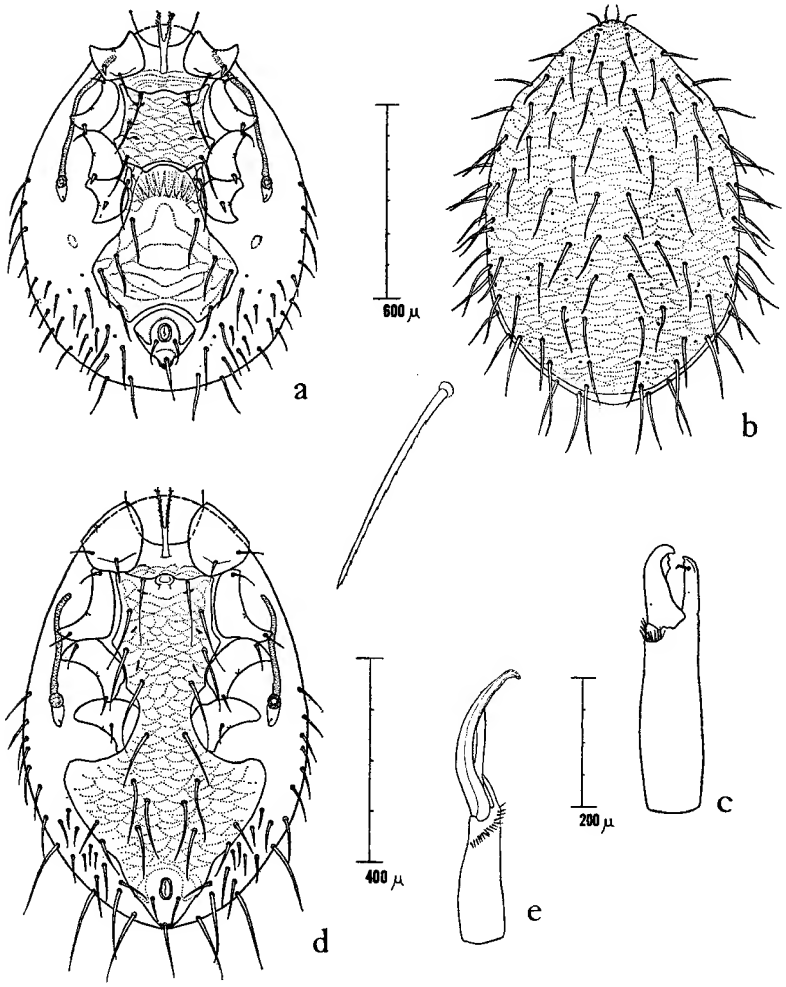

FIGURE 4.—*Laelaps echidnina:* **a**, female ventral view; **b**, female dorsal view with enlarged drawing of marginal seta (modified after Strandtmann and Mitchell, 1963); **c**, female chelicera; **d**, male ventral view; **e**, male chelicera.

Female. Large sized; dorsal shield 1048 μ long, 734 μ wide, with 39 pairs of setae, 11 pairs of setae on dorsal integument, marginal setae on integument and shield barbed; sternal shield 242 μ long, 236 μ wide, extending to middle of coxae III, posterior margin bilobate, metasternal setae on small shields, associated pores on integument; genital shield 424 μ wide, greatly expanded behind coxae IV, concave on posterior margin; anal shield 194 μ long, 198 μ wide, convex anteriorly, anal pore slightly anterior to center, paranal setae posterolateral to pore, shorter and finer than postanal seta; ventral integument with about 30 pairs of setae, metapodal shields ovate; peritreme extends to middle of coxa I; tarsi II-IV with some stout blunt setae; chelicera robust, chelae dentate, pilus dentilis long and slender, flexed at apex.

Male. Dorsal shield 830 μ long, 580 μ wide; holoventral shield 690 μ long, 430 μ wide, greatly expanded behind coxae IV; peritreme extends to middle of coxa II, chelae edentate, spermadactyl long and curved.

DISTRIBUTION: Cosmopolitan.

VOLCANO IS. Iwo JIMA: Recorded by Pippin and Shimada (1966) from *Rattus norvegicus.*

S. MARIANA IS. SAIPAN: Four females, two nymphs, Halaihai-As Teo area, ex *Rattus exulans,* Jan. 1945, Hagen and Dybas. GUAM: Ten females, four nymphs, Ritidian Pt., ex *Rattus* sp., June 1945, Gressitt.

PALAU. ANGAUR: Two females, ex *Rattus* sp., Dec. 1944, Lewellen.

PONAPE. Recorded by Alicata (1948a; 1948b) and Hurlbut (1949) from rats, and Jackson (1962) from *Rattus exulans* and *R. rattus.*

KUSAIE. Four females, Mutunlik, 22 m., ex *Rattus* sp., Feb. 1953, Clarke; two females, two nymphs, ex three *Rattus rattus ?flavipectus,* April 1953, Clarke.

MARSHALL IS. ARNO: Recorded by Marshall (1955) from *Rattus exulans;* three males, 14 females, two nymphs, Ine I., ex *Rattus* nest in *Pandanus,* July 1950, La Rivers. MAJURO: Recorded by Jackson (1962) from *Rattus exulans.*

HOSTS: Occurring chiefly on rodents of the genus *Rattus,* especially *R. norvegicus* and *R. rattus.*

6. Laelaps nuttalli Hirst (fig. 5).

Laelaps nuttalli Hirst, 1915, Bull. Ent. Research **6**: 183.—Hurlbut, 1949, Pacific Science **3** (3): 278.—Marshall, 1955, Jour. Mammal. **36** (2): 261.—Jackson (in Storer), 1962, B. P. Bishop Mus., Bull. **225**: 191.

Female. Medium sized; dorsal shield 572 μ long, 388 μ wide, with 40 pairs of setae, 11 pairs of setae on dorsal integument; sternal shield 84 μ long, 149 μ wide, extending to middle of coxae III, posterior margin concave, sternal setae two-thirds length of shield, metasternal setae on small shields, associated pores on integument; genital shield 152 μ wide, slightly expanded behind coxae IV, posterior margin moderately rounded or flat, distance between 4th pair of setae equal to or greater than distance between 1st pair; anal shield 104 μ long, 94 μ wide, anterior margin flat, anal pore in anterior half, paranal setae opposite posterolateral margin of pore, about three-quarters as long as postanal seta, ventral integument with about 10 pairs of setae, metapodal shields oblong; peritreme extends to middle of coxa I; coxae I-III each with 1 spiniform and 1 piliform setae; chelicera robust, chelae dentate, pilus dentilis slightly inflated distally.

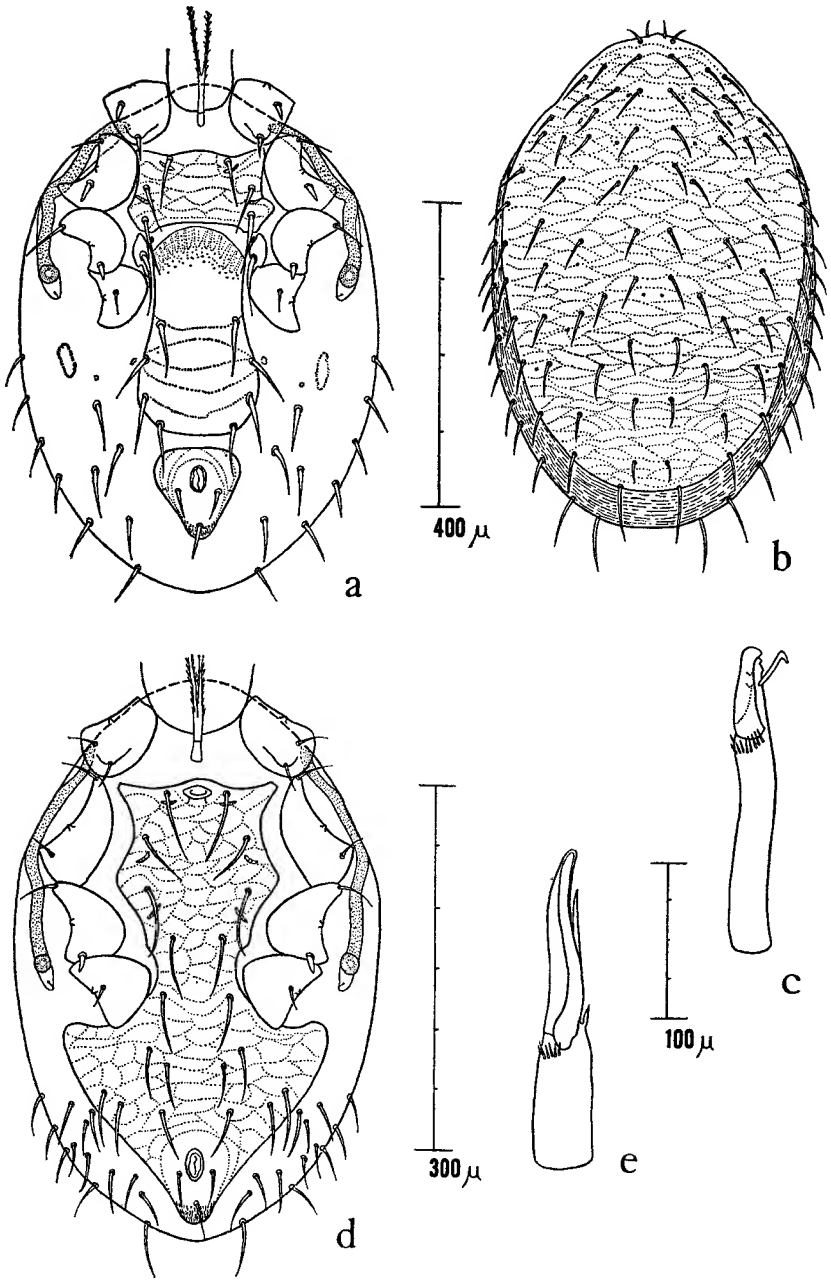

FIGURE 5.—*Laelaps nuttalli:* **a,** female ventral view; **b,** female dorsal view (modified after Tipton, 1960); **c,** female chelicera; **d,** male ventral view; **e,** male chelicera.

Male. Dorsal shield 450 μ long, 233 μ wide; holoventral shield 370 μ long, 183 μ wide, greatly expanded behind coxae IV; peritreme extends slightly past posterior margin of coxa I; chelae edentate, spermadactyl long, relatively straight.

DISTRIBUTION: Cosmopolitan except Europe.

S. MARIANA IS. SAIPAN: Female, As Lito-I Fadang area, Dec. 1944, Dybas; female, Halaihai-As Teo area, under bark, Jan. 1945, Dybas; two females, Halaihai-As Teo area, ex *Rattus exulans,* Jan. 1945, Hagen and Dybas; male, nine females, ex *Rattus norvegicus,* April 1945, Dybas and Marshall; two males, 11 females, ex *Rattus norvegicus,* May 1945, Dybas and Marshall; male, two females, ex *Rattus rattus mansorius,* May 1945, Dybas and Marshall.

PALAU. PELELIU: Three females, ex *Rattus rattus,* July 1945, Dorsey and Dybas.

YAP. Female, ex Berlese sample, July 1950, Goss.

PONAPE. Recorded by Hurlbut (1949) from rats and Jackson (1962) from *Rattus exulans, R. norvegicus,* and *R. rattus.*

KUSAIE. Eighteen females, Mutunlik, 22 m., ex *Rattus* sp., Feb. 1953, Clarke; female, Lele I., 100 m., ex *Ptilinopus ponapensis hernsheimi,* March 1953, Clarke; five males, 45 females, five nymphs, Mutunlik, 22 m., ex four *Rattus rattus ?flavipectus,* April 1953, Clarke.

MARSHALL IS. ARNO: Recorded by Marshall (1955) from *Rattus exulans.* MAJURO: Recorded by Jackson (1962) from *Rattus exulans.* KWAJALEIN: Fifteen females, two nymphs, ex *Rattus exulans,* Jan. 1966.

GILBERT IS. Six females, ex *Rattus* sp., Jan. 1944, Weiss.

HOSTS: Rodents of the genus *Rattus* are the preferred hosts.

FAMILY SPINTURNICIDAE

Genus **Meristaspis** Kolenati

Meristaspis Kolenati, 1857, Wiener Ent. Monatschr. **1** (2): 60.

Type species: *Pteropus lateralis* Kolenati, 1856.

The most recent review of this genus is by Rudnick (1960).

7. Meristaspis calcaratus (Hirst) (figs. 6, 7).

Ancystropus (*Meristaspis*) *calcaratus* Hirst, 1923, Zool. Soc. London, Proc., 983.

Meristaspis calcaratus: Rudnick, 1960, Univ. Calif. Pub. Ent. **17** (2): 183.—Delfinado and Baker, 1963, Pacific Ins. **5** (4): 910.—Baker and Delfinado, 1964, Pacific Ins. **6** (4): 581.

Female. Large sized; dorsal shield 517 μ long, 329 μ wide, broadly rounded anteriorly, tapering posteriorly to rounded tip; peritreme short, entirely dorsal; tritosternum over twice as wide as long; sternal shield 224 μ long, 180 μ wide, roughly flask-shaped; genital shield 38 μ long, 106 μ wide, fan-shaped anteriorly, rounded posteriorly, anal shield 81 μ long, 68 μ wide, postanal seta absent; coxae I-III with well-developed posterior lobe, tarsus I with 2 terminal paddle-shaped setae; chelicera slender, with small dentate chelae.

Male. Body: length of idiosoma 524 μ, width 411 μ. Dorsum: podosomal shield 474 μ long, 311 μ wide, shaped as in female and covering more of dorsum, with 11 pairs of pores; integument with simple longitudinal striations becoming scalelike caudally, with 7 pairs of setae, peritreme 137 μ long, slightly bowed, above coxa III. Venter: tritosternum over three times broader than long, 14 μ long, 50 μ wide, sternal shield 260 μ long, 161 μ wide, octagonal, enclosing posterior portion of genital pore anteriorly, extending to level of anterior margin of coxae IV posteriorly, with 3 pairs of setae and 2 pairs of pores; metasternal shields small, elongate, flanking posterolateral margins of sternal shield; simple anal shield 73 μ long, 48 μ wide, with broadly rounded anterior margin, postanal seta absent; integument with simple striations, 6 pairs of setae between coxae III-IV. Gnathosoma: 1 pair of long slender gnathosomal setae, 2 pairs of hypostomal setae, distal pair longest on gnathosoma, proximal pair very short, hypostomal processes long and slender, with harpoon-shaped tips, chelicera long and slender with dentate chelae. Legs: as in female except terminal pair of setae on tarsus I long and slender, anteroventral setae on tibia-tarsus I less stout, posterior lobe absent on coxa I, less developed than in female on II-III.

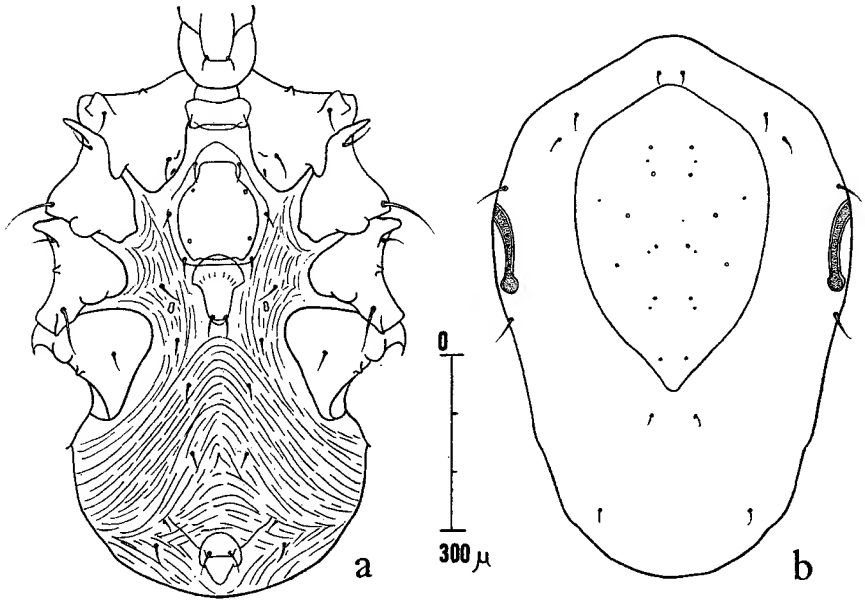

FIGURE 6.—*Meristaspis calcaratus,* female: a, ventral view; b, dorsal view (modified after Rudnick, 1960).

DISTRIBUTION: Old World tropics.

S. MARIANA IS. SAIPAN: Recorded by Rudnick (1960) from *Pteropus mariannus mariannus* and by Baker and Delfinado (1964) from fruit bat. GUAM: Recorded by Rudnick (1960) from *Pteropus mariannus mariannus*; two males, six females, Tarague, ex *Pteropus* sp., May 1936, Usinger.

PALAU. PELELIU: Recorded by Rudnick (1960) from *Pteropus* sp.

HOSTS: *Pteropus geddiei, P. hypomelanus, P. mariannus mariannus, P. rufus, P. speciosus, P. tablensis, P. vampyrus, Pteropus* sp., fruit bat, flying fox.

The male of this species is described for the first time. It may be distinguished from known males of other species of *Meristaspis* by the octagon-shaped sternal shield with only three pairs of setae.

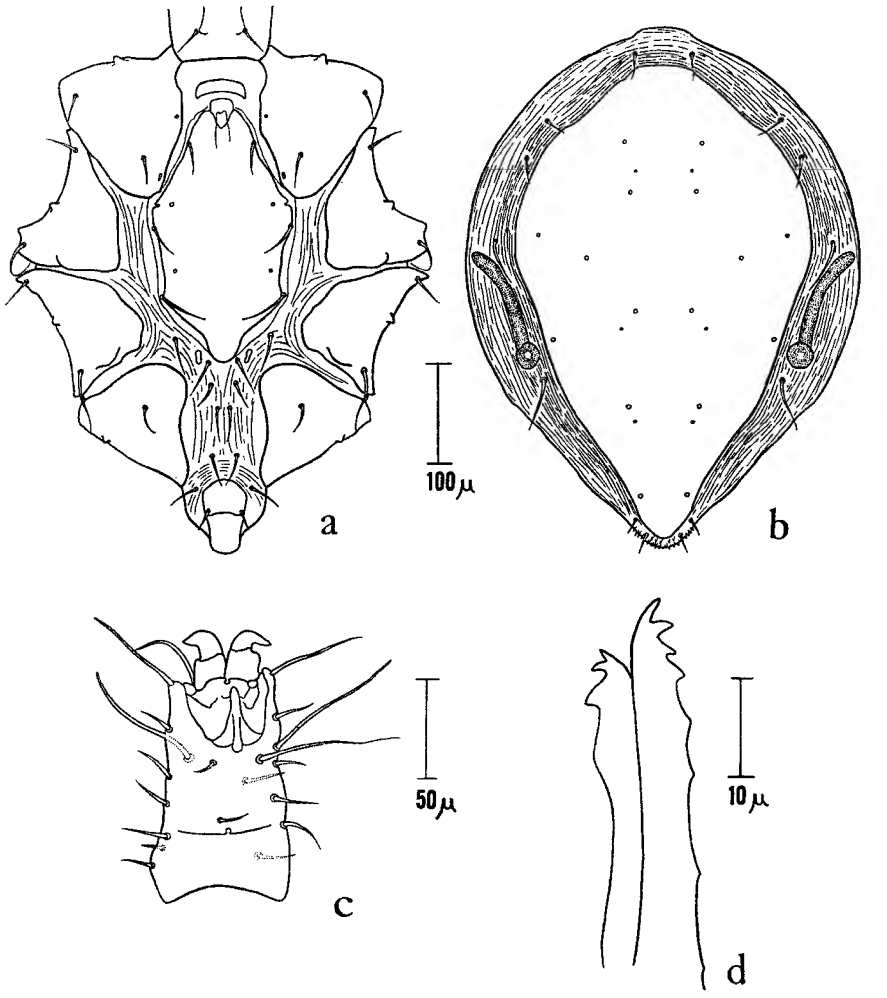

FIGURE 7.—*Meristaspis calcaratus,* male: **a,** ventral view; **b,** dorsal view; **c,** tarsus I, ventral view; **d,** chelicera.

ADDENDUM

The following additional record from Micronesia was received too late for inclusion in its proper place in the paper.

Neolaelaps spinosa (Berlese).

Leiognathus spinosus Berlese, 1910, Redia **6**: 261.

Neolaelaps spinosa: Radovsky, 1967, Univ. Calif. Pub. Ent. **46**: 37.

DISTRIBUTION: Old World tropics except Africa.

PALAU. PELELIU: Recorded by Radovsky (1967) from *Pteropus* sp.

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